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Gender Differences in Five Factor Model Personality Traits in an Elderly Cohort: Extension of Robust and Surprising Findings to an Older Generation

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Abstract

In college and adult samples, women score higher then men on the Five Factor Model (FFM) personality traits of Neuroticism and Agreeableness. The present study assessed the extent to which these gender differences held in a sample of 486 older adults, ranging in age from 65-98 (M = 75, SD = 6.5), using the NEO-Five Factor Inventory. Mean and Covariance Structure models testing gender differences at the level of latent traits revealed higher levels of Neuroticism (d = .52) and Agreeableness (d = .35) in older women than older men. The consistency of these findings with prior work in younger samples attests to the stability of gender differentiation on Neuroticism and Agreeableness across the lifespan. Gender differences on these traits should be considered in personality research among older, as well as middle age and younger adults.

Keywords

Gender Differences; Personality Traits; Older Adults; Five Factor Model

Women score higher on the Five Factor Model (FFM) traits of Neuroticism and Agreeableness (Costa, Terracciano & McCrae 2001). The former reflects distress proneness and propensities toward the experience of a variety of negative affects, while the latter reflects amicability, altruism, trust, tendermindedness, and compliance. Gender differences on these traits are of medium magnitude: Costa and colleague's comprehensive study showed US adult women scored .51 SD higher on Neuroticism and .59 SD higher on Agreeableness. Costa et al. replicated this pattern of gender differences across 26 different nations in data comprising over 23,000 individuals. These findings cannot easily be attributed to self-report artifacts, as McCrae and colleagues (2005) have replicated them in observer reports of FFM traits across 50 cultures. Goodwin and Gotlib (2004) replicated the Neuroticism and Agreeableness findings in a nationally representative sample using a brief trait-adjective measure of the lexical Big Five (cf. also Goldberg et al., 1998), suggesting these gender differences are not a sole function of

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the instrument on which Costa and McCrae's findings are based, the NEO-Personality Inventory Revised (NEO-PI R; Costa & McCrae, 1992).

Gender differences on Extraversion (encompassing gregariousness, excitement seeking, and positive affect) and Openness to Experience (encompassing interest in novel people, ideas, and aesthetics) have been either inconsistent or of negligible magnitude in large, statistically well-powered samples (cf. Feingold, 1994). However, Costa et al. (2001) investigated gender differences across specific aspects of these broad FFM domains, finding that men scored higher in some facets of Openness, such as Openness to Ideas, while women scored higher in others such as Openness to Aesthetics and Feelings. Men scored higher in some facets of Extraversion such as Excitement Seeking, while women scored higher in other Extraversion facets such as Warmth. Comparisons at the aggregrate level of Extraversion and Openness are thus less meaningful. Men and women appear to differ little on either specific aspects of Conscientiousness (encompassing such qualities as diligence, self-discipline, orderliness, and goal-orientation) or the subdimensions it comprises.

Combined biological and sociocultural explanations have been offered to explain these findings. Neuroticism and Agreeableness are genetically based, species-invariant, and the result of adaptation to selection pressures which vary across men and women (Buss, 1995). Budaev (1999) suggested an evolutionary hypothesis that Neuroticism and Agreeableness together represent a single dimension with low Neuroticism and low Agreeableness at one end, and high Neuroticism and high Agreeableness at the other. His data suggested men and women fall at opposite ends of this dimension.Costa et al. (2001) stipulated that a purely evolutionary explanation entails two corollaries: First, the traits on which men or women differ are consistent across cultures; second, gender differences in these traits are of the *same general magnitude*. Costa et al.'s (2001) findings supported the former. However, gender differences were larger, rather than smaller, in industrialized countries where more progressive socioculture gender role norms would presumably lead to smaller differences. Thus, Costa and colleagues concluded that gender differences on Neuroticism and Agreeableness stemmed from stable evolutionary and biological bases, but Social Role Theory (Eagley, 1987), which articulates socialization processes leading to different roles and behaviors for men and women, also held potential usefulness for understanding gender differences in Neuroticism and Agreeableness (Costa et al., 2001; McCrae, et al., 2005).

One important area which remains unexplored is whether these findings are replicable at later points in the lifespan. Previous findings on adult self-reported FFM trait gender differences in the U.S. are confined to the NEO-PI R normative sample (Costa et al., 2001), which had a mean age of 49 (Costa & McCrae 1992; Costa et al., 2001). Earlier work on trait gender differences used almost exclusively young adults (cf. Feingold, 1994), and findings of observer-rated trait gender differences both in the U.S. and other cultures used college-age targets for these ratings (McCrae et al., 2005).

The question of whether the consistency in trait gender differences extends to an older cohort is important for at least two reasons. First, evidence for the same pattern of gender differences would reveal important evidence for the robustness of biological/sociocultural phenomena across the lifespan, as well as across culture. Second, considerable interest is accumulating in the importance of personality for health outcomes in older adults. Gender differences in these traits may have important implication for differences in the risk conferred by high Neuroticism and low Agreeableness (Smith & Spiro, 2002).

Using a sample of 486 older adults ($M = 75.02$, $SD = 6.54$), we hypothesized that women would score higher on both Neuroticism and Agreeableness, as in younger samples. Recent reports find no evidence for gender differences in rates of mean level personality changes across the

lifespan (Roberts et al., 2006; Terracciano et al., 2005); thus one would not expect the relative differences between men and women's mean levels of these traits to change in older age. A supplementary aim was to test whether some previously reported findings at the level of more specific components of FFM domains would be replicable. Based on item similarity between the subcomponents of the 60-item NEO-Five Factor Inventory (NEO-FFI; Costa & McCrae, 1992) and the facets of the 240-item NEO-PI R on which earlier findings were based, we hypothesized that women would also score higher than men on all Neuroticism and Agreeableness subcomponents, and that women would score higher on the Openness subcomponent Aesthetic Interests, while men would score higher on the Openness subcomponent Intellectual Interest. We offered no additional hypotheses at the level of specific NEO-FFI subcomponents because they do map isomorphically onto NEO-PI R facets (Chapman, in press; Saucier, 1998), but explored gender differences on them.

Method

Participants

Participants were drawn from a larger study on the psychosocial and physical health of older adults in primary care (Lyness, Nikelescu, Tu, Reynolds, & Caine, 2006). All patients age 65 or older capable of giving informed consent who presented for primary care on selected recruitment days in community doctors' offices were eligible. Older adults visit primary care providers for a variety of reasons, many related to routine management of chronic conditions of aging. Thus the sample comprised older adults with a wide range of health and medical conditions.

Of 1500 older adults approached, 751 consented and underwent semi-structured interviews with trained interviewers in their homes or at the University of Rochester Medical Center assessing mental and physical health, functioning, social support, and other aspects of health and psychosocial life circumstances. The sample ranged in age from 65 to 97 years (M = 75.02, SD = 6.54), were predominantly Caucasian (92%) and female (64%). Participants were given a packet of questionnaires (including the NEO-FFI), with 516 returning them (69%) and 486 yielding usable data. These individuals did not differ in age or gender from those who did not return the personality measure, but were slightly more educated, (M = 14.25 years, SD = 2.38, v. M= 13.46 years, SD = 3.19) (t (352) = 3.35, p = .001) and less likely to be minorities ($X^2(1) = 35.15$, p <.001). Three-hundred-and-five participants (64%) were female, while 181 (36%) were male.

Measures

NEO-FFI—The NEO-FFI (Costa & McCrae, 1992) is a 60-item personality inventory designed to assess the broad domains of the FFM: Neuroticism, Extraversion, Openness to Experience, Agreeableness, and Conscientiousness. The present study used a modified form of the NEO-FFI with enlarged type so that participants with poor/impaired vision could easily read it. The NEO-FFI has been used in a similar primary care setting (Lyness et al., 1998; Duberstein et al., 2003), and in an elderly Medicare sample (Weiss et al., 2005). Cronbach's alpha (α) internal consistency estimates for scores based on a normative sample of employed adults (Costa & McCrae, 1992) are .86 (Neuroticism), .77 (Extraversion), .73 (Openness), .68 (Agreeableness), and .81 (Conscientiousness).

As a short form of the NEO-PI R, NEO-FFI domain scores are highly similar to the longer instrument. Although the FFI was not intended to yield specific facet-like subscales, Saucier (1998) developed subcomponents for each domain, the psychometrics of which Chapman (in press) examined in detail. Fewer in number and shorter than facets of the longer NEO-PI R, the subcomponents are dominated by item content from one primary facet, as follows:

Neuroticism: Depression (3 items, Depression), Anxiety (3 items, Anxiety), and Self-Reproach (2 items, Vulnerability, 1 item, Self Consciousness, 1 item, Depression); Extraversion: Positive Affect (4 items, Positive Emotion), Sociability (2 items, Gregariousness, 1 item Warmth, 1 item Assertiveness), and Activity (3 items, Activity, 1 item, Excitement Seeking**);** Openness: Intellectual Interests (3 items, Openness to Ideas), Aesthetic Interests (3 items, Openness to Aesthetics), and Unconventionality (2 items, Openness to Values, 1 item, Openness to Actions, 1 item, Fantasy); Agreeableness: Prosocial Orientation (3 items, Altruism, 1 item, Straightforwardness) and Nonantagonistic orientations (3 items, Compliance, 2 items, trust, 1 item each Tendermindedness, Altruism, Straightforwardness); Conscientiousness: Orderliness (3 items, Order, 2 items, Self Discipline), Goal-Striving (3 items, Achievement Striving), and Dependability (3 items, Dutifulness, 1 item, Self Discipline).

Analyses

Differences between men and women on FFM traits were tested using Mean and Covariance Structure Analysis (MACS; Ployhart & Oswald, 2004; Vandenberg & Lance, 2000). By comparing means at the level of the latent traits, this strategy permits error free comparisons with rigorous factorial invariance across men and women. Each MACS model specified configural invariance (identical factor loading patterns), metric invariance (equal item loadings), scalar invariance (equal item intercepts), and structural invariance (equal factor variances and covariances) across men and women (Ployhart & Oswald, 2004; Vandeberg & Lance, 2000). Factor variances were fixed at 1 to scale factors, producing latent mean differences reflecting an effect size (Ployhart & Oswald, 2004).

Five separate models were estimated, one for each of the five NEO-FFI domains, with the appropriate twelve NEO-FFI items as indicators of their corresponding latent trait (i.e., one factor models for each NEO-FFI domain). For each domain, a model was also estimated in which items were specified as indicators of their corresponding subcomponent (i.e., 2-3 factor models according to the number of subcomponents of each domain). Factor covariances were estimated and constrained to equality within and between groups, and residual correlations were permitted within, but not between the positively and negatively worded items for each domain (Saris & Aalberts, 2003). Models were estimated using Diagonally Weighted Least Squares estimation, treating the 0-4 Likert scale NEO-FFI items as ordered categorical indicators (Flora & Curran, 2004).

Based on recommendations for personality data (Beauducel & Whittmann, 2005; Raykov, 1998) we gauged model fit based primarily on the Root Mean Square Error of Approximation (RMSEA), with values below .05 indicating good fit, .05 to .10 acceptable fit, and above .10 poor fit, supplemented by the CFI values greater than .90 generally considered indicative of adequate fit (Browne & Cudeck, 1993; Marsh, Hau, & Wen, 2004). Cohen's (1992) guidelines of .3 suggesting a small effect size, .5 indicating a medium effect size, and .8 a large effect size were used, and alpha value was set at .01 for exploratory comparisons involving the subcomponents to protect against type I error. Analyses were performed using M Plus Version 3.

Results

Means and standard deviations for NEO-FFI domain and subcomponent raw scores for men and women are displayed in the left columns of Table 1. Preliminary examination of Cronbach's alpha estimates of internal consistency (also in Table 1) revealed adequate values for domains and some subcomponents, but lower values for others, reinforcing the necessity of modeling gender differences in latent means. The fit of the MACS models imposing full configural, metric, scalar, and structural invariance across men and women is displayed in the middle part of Table 1, and indicate adequate fit of models at both the domain and subcomponent level.

Latent mean differences are displayed in the right of Table 1 in the form of Cohen's *d* metric of effect size, with positive numbers indicating higher latent means in women and negative indicating higher latent means in men. Both hypothesized gender differences emerged at the level of NEO-FFI domains: Women were higher on Neuroticism ($z = 4.84$, $p < .001$, $d = .52$) and Agreeableness ($z = 3.27$, $p < .01$, $d = .35$), with the gender difference of medium magnitude.

Women also scored higher on the subcomponents of both Neuroticism and Agreeableness: Self-Reproach ($z = 4.86$, $p < .001$, $d = .61$), Anxiety ($z = 4.56$, $p < .001$, $d = .51$), and Depression ($z = 4.07$, $p < .001$, $d = .45$) for Neuroticism, and Prosocial ($z = 2.88$, $p < .01$, $d = .38$) and Nonantagonistic Orientation ($z = 3.00$, $p < .01$, $d = .32$) for Agreeableness. The hypothesized gender differences for Openness subcomponents also obtained, with men higher on Intellectual Interests ($z = -2.95$, $p < .01$, $d = -.35$) and women higher on Aesthetic Interests ($z = 2.98$, $p < .01$, $d = .32$), gender differences again medium in degree. Exploratory analyses of other subcomponents revealed that men scored higher on the Activity subcomponent of Extraversion ($z = 3.04$, $p < .01$, $d = -.40$). Gender differences on other FFI domains and subcomponents were non-significant.[1]

Discussion

As hypothesized, older women scored moderately higher on Neuroticism and Agreeableness than older men, and on all specific components of these domains. Older women scored higher on the Aesthetic Interest, while older men scored higher on the Intellectual Interest component of Openness. The consistency of these findings across different points in the lifespan is consistent with the notion that biological and sociocultural forces responsible for this gender differentiation do not diminish in old age.

FFM traits have traditionally been considered to have strong biological bases, with heritability estimates on the order of .5 (Loehlin, McCrae, Costa, & John, 1998). This would suggest relatively persistent gender differences across the lifespan as well as across culture. Our results are congruent not only with prior findings in adult samples but also with reports by Barefoot and colleagues (2001) of higher levels of depression, and by Lowe and Reynolds (2006) of higher levels of anxiety in older adult women. The persistence of earlier socialization processes (Eagley, 1987) could also factor into such findings, such as norms permitting women to disclose more negative feelings (e.g., Reynolds, 1998). In later life, women are also confronted with a number of gender-specific age-related role transitions (i.e. mother to grandmother) and health issues (i.e. osteoporosis, increasing risk of breast and ovarian cancer) which may maintain the gender gap in Neuroticism observed at earlier ages (Sinnott & Shifren, 2001).

Agreeableness findings are also consistent with well-replicated results from earlier life phases (Costa et al., 2001; Feingold, 1994). Both evolutionary and social role theory explanations have been proffered for the consistent finding that women tend to be more nurturing. Evolutionary explanations emphasize the adaptive advantage for reproduction and preservation of offspring conferred by sensitivity and nurturance (Buss, 1995), while social role theory attributes female nurturant behavior to feminine gender role socialization (Eagley, 1987). These explanations appear equally applicable to older adults, or at least suggest that gender differentiation on Agreeableness achieved earlier in life remains in older adulthood.

As in younger samples (Costa et al., 2001), men evinced more Intellectual Interests, and women more Aesthetic Interests. In explanations of such differences among adults, Costa and colleagues have (2001) have noted that men favor more information-oriented occupations,

[1]Analyses of subcomponent observed scores using MANOVA followed by t-tests yielded similar results. We would like to thank an anonymous reviewer for this suggestion.

while women prefer aesthetically oriented occupations (Costa, McCrae, & Holland, 1984). It remains unclear whether this is a cause or result of gender differentiation on these aspects of Openness, but a reasonable hypothesis would be that personality and vocation mutually influence one another: Gender differences in intellectual and aesthetic pursuits may emerge during schooling, leading to different educational and career trajectories. Spending one's work years in occupations congruent with one's basic tendencies may in turn strengthen those tendencies, entrenching gender differentiation in these aspects of Openness. Of course, there are many men who favor aesthetic pursuits and many women who favor intellectual activities, so gender differences are averages only about which individuals vary.

Exploratory analyses of other subcomponents showed that men scored moderately higher on the Activity dimension of Extraversion, which assesses dispositional energy levels and physical vigor. This finding appears congruent with literature on physical exercise and activity in older adults suggesting that men engage in more ambulatory walking and other forms of physical exercise (Lee, 2005). Findings at earlier points in the lifespan suggest that women score slightly higher on the NEO-PI R Activity facet. The pattern may be truly reversed in old age, perhaps as a result of the higher incidence of osteoporosis in older women compared to men, or may be dependent on the measurement differences between this NEO-FFI subscale and that of the NEO-PI R.

A final interesting comment concerns the magnitude of the difference between men and women on Agreeableness. While the present effect size we found for Neuroticism (d = .52) was nearly identical to that reported in earlier work on adult samples (d = .51 in Costa et al., 2001), the effect size observed for Agreeableness in the present study (d = .35) is somewhat less than that observed in prior work on adults (d = .59 in Costa et al., 2001). One possible explanation for this is the differences in measures and analytic strategies between this study and that one. However, another interesting possibility is that gender differences on Agreeableness do actually diminish to some degree in older adulthood as a result of shifting role demands (Sinnot & Shifren, 2001). For instance, Guttman's (1987) cross-over hypothesis postulates that men may become less assertive and dominant with age after establishing themselves in careers and turning attention to parenting, whereas with age women may become less nurturing and more assertive after shifting their focus from motherhood to career or other interests. Such shifts would explain attenuation in the Agreeableness gender gap in later life. Perhaps future work can investigate this issue directly.

Our results must be considered in the context of a few qualifications. First, the present results are based primarily on self-report. McCrae et al. (2005) replicated patterns of trait differences in observer reports of young adults. A similar replication in older adults is required to rule out reporting bias. Second, we used the NEO-FFI rather than the NEO-PI R, so we were unable to thoroughly investigate the full complement of gender differences observed at the specific facet level of the latter instrument. Future work might examine NEO-PI R facet gender differences in older adults. Third, our sample was recruited from random sampling of visits to a primary care clinic and, while potentially representative of general older community samples, may be different in some ways. Community based survey studies may address this.

Taken on balance, these results represent an important extension of prior findings to an elderly cohort. In old age, as well as midlife and young adulthood, women score higher than men on Neuroticism and Agreeableness. Gerontological research incorporating personality measures may wish to consider the implications of these gender differences for a variety of different lifespan research areas, including health. The gender differences in Neuroticism and Agreeableness that are by now well-established in younger samples appear persistent across the lifespan.

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Table 1

Mean and Covariance Structure Models of Gender Differences in FFM Traits

Domain Models	Cronbach's Alpha	Men (n=181) Raw Score *M* (*SD*)	Women (n=305) Raw Score *M* (*SD*)	Model X^2 (df)	Model CFI	Model RMSEA	Latent Mean Difference (*d*)
Neuroticism	.88	12.76 (7.36)	16.48 (7.74)	82.08 (33)***	.98	.08	.52***
Extraversion	.80	28.93 (6.63)	28.10 (5.93)	132.33 (47)***	.93	.09	−.12
Openness	.73	26.70 (6.09)	27.03 (5.47)	163.56 (61)***	.90	.08	.09
Agreeableness	.72	34.22 (4.91)	35.99 (4.83)	123.42 (58)***	.93	.07	.35**
Conscientiousness	.83	34.52 (5.94)	34.00 (5.75)	83.45 (28)***	.94	.09	−.10
Subcomponent Models							
Neuroticism				48.92 (24)**	.99	.07	
Self Reproach	.77	6.93 (4.25)	8.86 (4.43)				.61***
Depression	.72	3.63 (2.27)	4.55 (2.51)				.51***
Anxiety	.74	3.97 (2.48)	5.01 (2.50)				.45***
Extraversion				105.27 (46)***	.95	.07	
Positive Affect	.70	10.19 (2.80)	10.36 (2.58)				.06
Sociability	.60	9.73 (2.60)	9.44 (2.40)				−.12
Activity	.69	9.01 (2.76)	8.31 (2.72)				.40**
Openness				92.185 (50)***	.96	.06	
Aesthetic Interests	.71	6.84 (2.47)	7.56 (2.24)				.32**
Intellectual Interests	.66	7.95 (2.30)	7.37 (1.97)				−.35**
Unconventionality	.40	7.62 (2.31)	7.42 (2.18)				−.26
Agreeableness				128.24 (63)***	.93	.07	
Nonantagonistic Orientation		21.61 (3.87)	22.97 (3.85)				.32**
Prosocial Orientation	.56	12.61 (1.63)	13.02 (1.64)				.37**
Conscientiousness	.59			60.35 (26)***	.96	.07	
Orderliness	.70	14.03 (3.13	13.87 (3.13)				−.11
Goal Striving	.63	8.30 (1.84)	7.96 (1.73)				−.21
Dependability	.70	12.19 (2.07)	12.16 (2.07)				−.02

Note. Results from Mean and Covariance Structure (MACS) models establishing configural invariance (same factor pattern), metric invariance (equal loadings), scalar invariance (equal intercepts), and structural invariance (equal factor variances and covariances) across men and women at the levels of NEO-FFI domains and subcomponents prior to testing differences of latent means. Mean difference expressed in Cohen's *d* metric, with positive *d*s indicating higher means for women, and negative *d*s indicating higher means for men.

CFI = Comparative Fit Index, RMSEA = Root Mean Square Error of Approximation

* = p < .05

** = p < .01

*** = p < .001